

 **AIR**Categories: AIR / Bombs / Atomic bombs and charges / RDS-3 / product 501-M (1951) /

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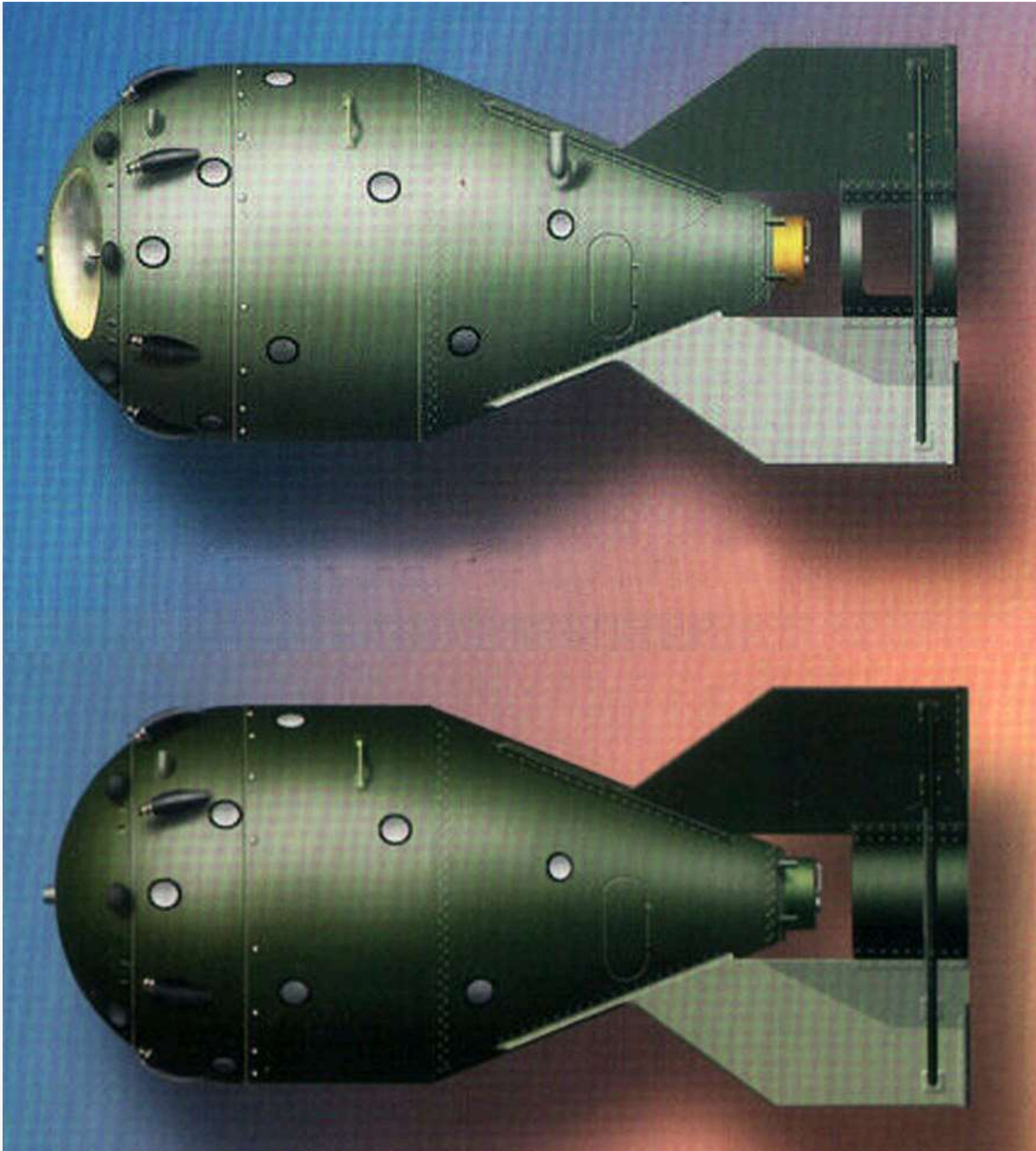
A large, grey, cylindrical aircraft bomb, the RSC-3, is displayed in a museum. The bomb has a bulbous nose section with several circular ports and a large, complex tail fin assembly. A small informational plaque stands in front of it. The background is a dark curtain, and the floor is a light-colored tile.

Atomic bomb RDS-3 / product 501-M (<https://museum12qu.mil.ru/>)

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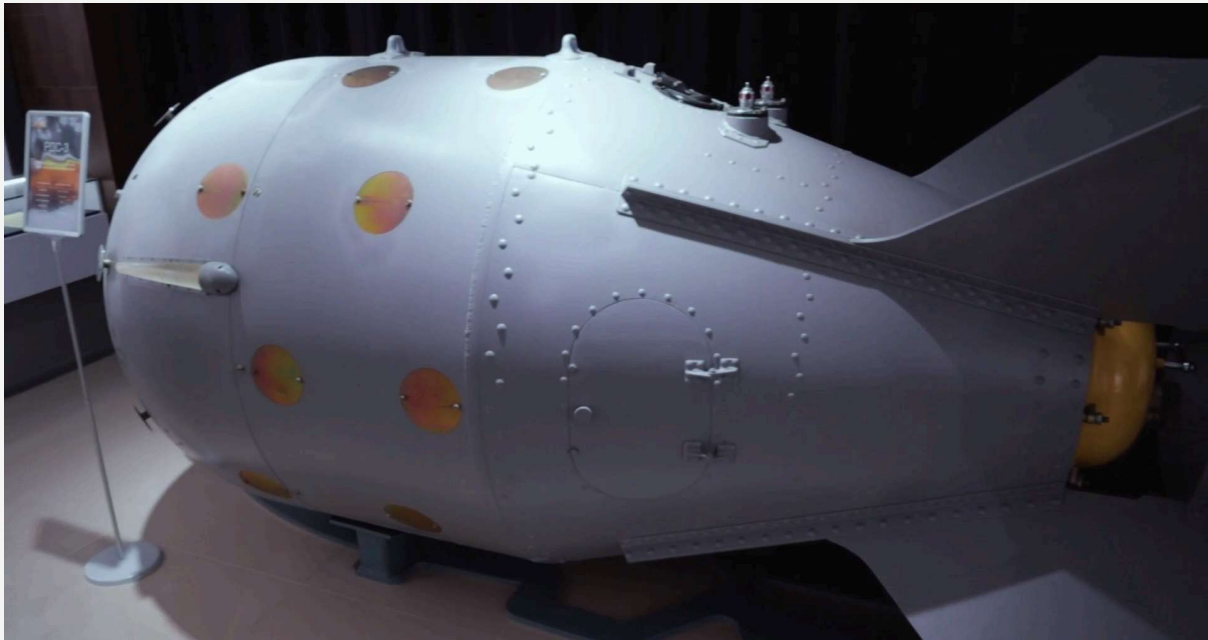


Products 500 (top) and 501-M (bottom) - the first atomic bombs (First generation (strokes to the portrait of the first nuclear bombs of the USSR). // Wings of the Motherland, No. 9 / 2008)

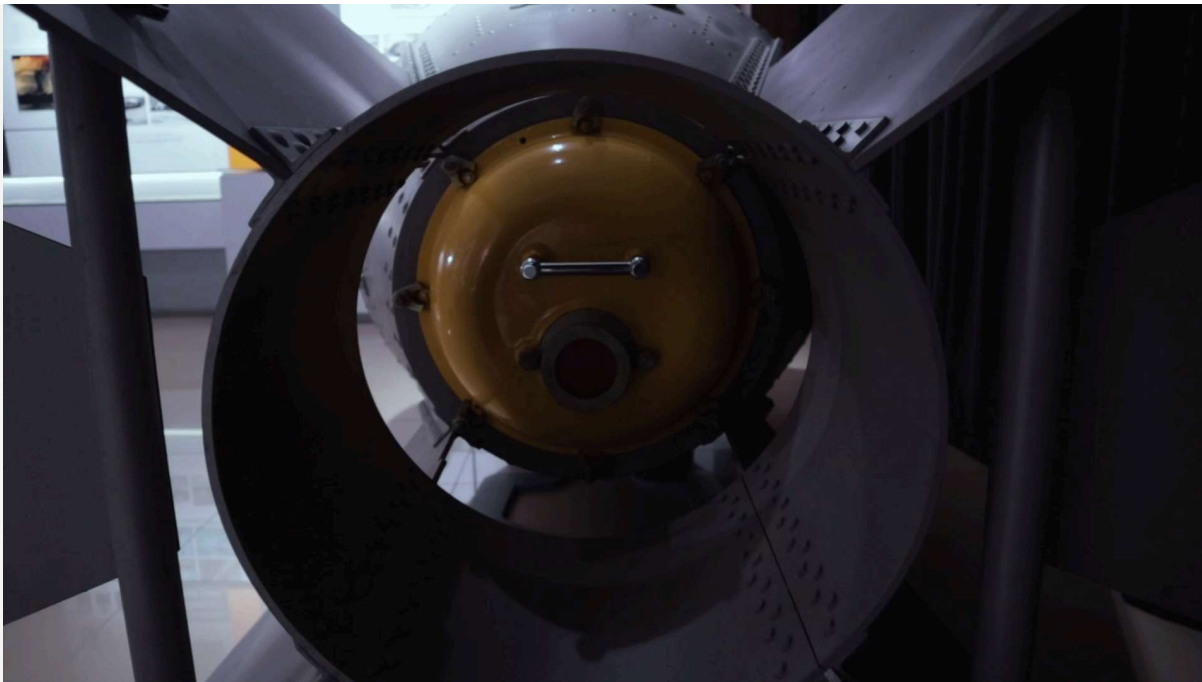
**The bomb design** is similar to the RDS-1 bomb / product 501, but it is smaller in diameter and lighter in weight. The design was made with a large and often excessive safety margin. The charge is of the implosion type, a shell-nuclear design with a cavity inside which is a core of uranium-235 and plutonium-239. A new system of focusing with chemical explosive is used.

The power supply for the automatics was provided by 12-AO-50 lead batteries.

The automatics unit is presumably BA-3 developed by KB-11.







Details of the serial atomic bomb RDS-3 / product 501-M (<https://museum12gu.mil.ru/>)

**RDS-3 bomb / product 501-M performance characteristics :**

Length - approx. 3,300 mm

Diameter - 1,250 mm

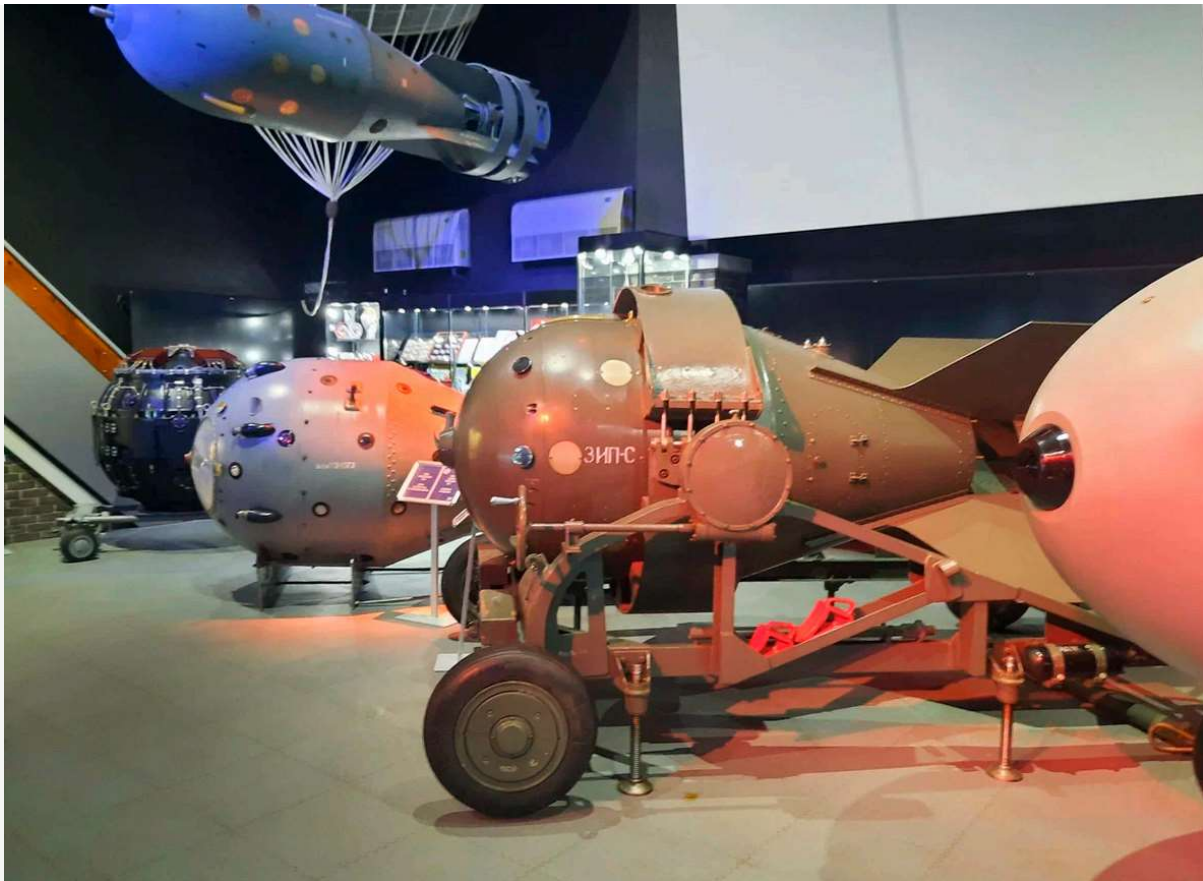
Weight - 3,100 / 3,200 kg (according to various sources)

Power:

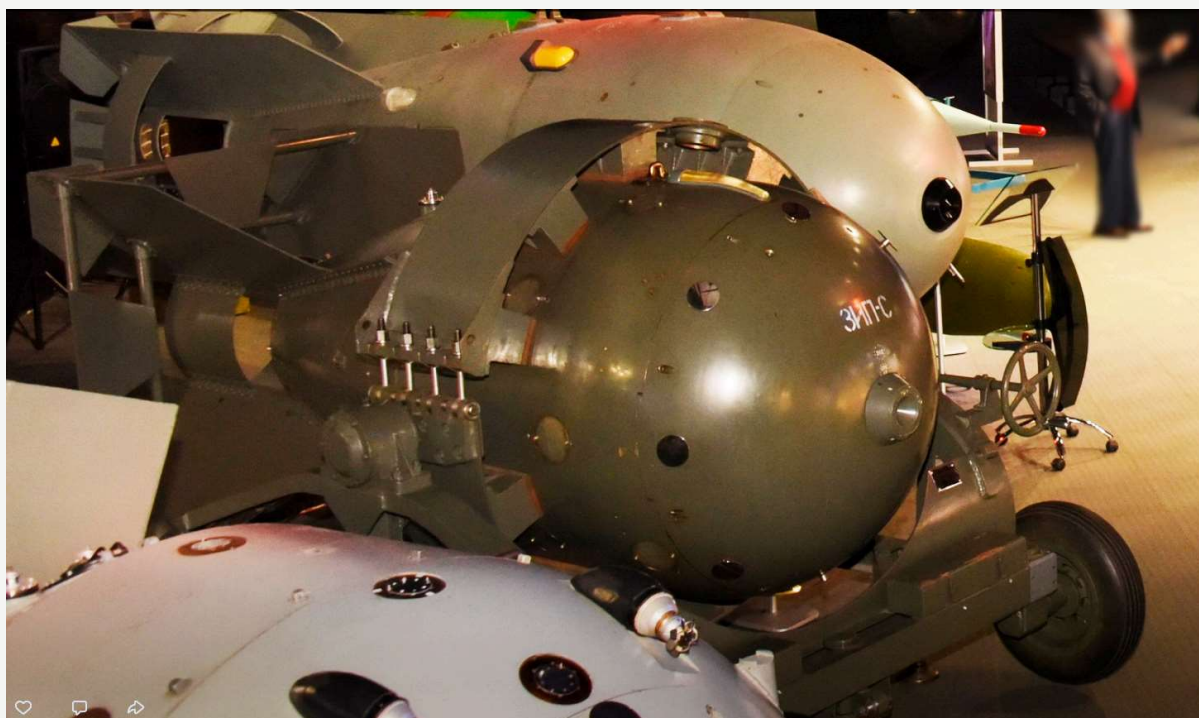
- 42 kt (during the test explosion on 18 October 1951)

- 120 kt (presumably the nominal theoretical maximum power of the RDS-3I bomb)

**Charge type** - an atomic charge made according to the shell-nuclear scheme, but the charge had a new, lighter focusing system. The RDS-3 design retained one of the main geometric parameters of the RDS-1 charge - the outer radius of the spherical charge of explosive (the same explosive as in the RDS-1 and RDS-2 charges - a mixture of TNT with hexogen in a ratio of 1: 1 - TG 50/50). Externally, the charge was no different from the RDS-2 charge . The working substance of the charge was uranium (U-235) and plutonium (Pu-239)







RDS-3 bomb on a transport trolley in the RFNC VNIIEF museum, 2022-2024 (<https://yandex.ru/maps/>)

#### Modifications :

**RDS-3 / product 501-M** - an improved uranium-plutonium model of the RDS-1 bomb, produced serially along with the RDS-2 / 501-M bomb.

**RDS-3I / RDS-3INI / product 501-MI** - a bomb with an RDS-3 charge with an external pulsed neutron source (INI), which made it possible to increase the bomb's power by 3 times without increasing the amount of fissile materials. In 1951, under the supervision of A.A. Brish, the issue of creating an INI was theoretically worked out. In 1952, prototypes of the device and new automatics for the munition were manufactured. A test explosion was successfully conducted on October 23, 1954. In 1954-1955, the efficiency of the detonation system with an external INI was confirmed by tests consisting of two atomic and one thermonuclear bomb. The new INI system worked at the optimal moment, did not impose restrictions on the design of the nuclear warhead, and made it possible to increase the safety of nuclear weapons (NW). The RDS-3I bomb used a new automation unit - BA-4.

The BA-4 automation unit was a device that formed a powerful high-voltage electric pulse to detonate the NW detonator caps and generated a pulsed neutron flow with a given time delay. In this case, pre-charged powerful high-voltage capacitors were switched, an electric time delay circuit began to

operate, the signal from which launched a pulsed neutron tube irradiating the nuclear charge.



Automatic control unit BA-4 (VNIIA named after N. L. Dukhov)

**Status :** USSR

- 18.10.1951 - first test of RDS-3. Many sources indicate that this date was the test of a bomb with an RDS-2 charge. They were actually tested on the same day - RDS-2 - ground explosion, RDS-3 - dropped from an aircraft. The similarity of the products is due, among other things, to the production of bombs in the 501-M product casing.
- 23.10.1954 - test explosion of the RDS-3I bomb dropped from a Tu-16 carrier aircraft at the Semipalatinsk test site. Explosion yield - 62 kt (presumably half yield).

Production of bombs with an RDS-3 / 501-M charge:

	Plant No. 551	Plant No. 418
1951		
1952	16 units	
1953	from the beginning of the year to July inclusive, 14 units were manufactured, including 2 units in July 1953 ( <a href="#">source</a> )	
1954		plan - 40 units together with RDS-2

**Sources :**

501M (RDS-2, RDS-3). External appearance ( [source](#) ).  
The atomic era of Russian aviation. M. "Stolichnaya Encyclopedia", 2019.  
Report of I.V. Kurchatov and N.I. Pavlov to L.P. Beria on the progress of preparations for testing, August 28, 1951 // Atomic project of the USSR, v.2, book 7, p. 307  
Chronology of indices of the first RDS. 2013 ( [source](#) ).

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